REMARKS

The Applicants appreciate the Examiner's thorough examination of the application and requests reexamination and reconsideration of the application in view of the following remarks.

The Examiner rejects claims 1-4, 7-8, 10-12, 15-18, 20-23 and 27-32 as allegedly being anticipated by U.S. Patent No. 6,041,642 to Duncan. The Examiner rejects claims 5-6, 9, 13-14, 19 and 24-26 under 35 U.S.C. §103 as allegedly being unpatentable over Duncan in view of U.S. Patent No. 3,840,804 to Sauerland.

The subject invention results from the realization that a truly effective sensor readout circuit can be achieved, not by sweeping the frequency response of a sensor, measuring the magnitude and phase shift at each chosen frequency, and then determining whether the chosen frequency represents the resonant frequency, but, instead by the combination of a unique phase detector circuit connected to an output and an input of a flexure plate wave sensor which detects the phase difference between the input and an output signal of the flexure plate wave sensor, and a drive circuit responsive to the phase detector circuit which maintains a fixed phase difference between the input signal and output signal to provide a continuous output of a frequency equal to the resonant frequency of the sensor.

To advance prosecution, Applicants have amended claim 1 of the subject application, which recites "a sensor readout circuit which provides a frequency signal output, the readout circuit comprising: a phase detector circuit responsive to an output signal from a flexure plate wave sensor and an input signal to the flexure plate wave sensor and configured to detect the phase difference between the input signal and the output signal; a drive circuit responsive to the phase detector circuit and configured to maintain a fixed phase difference between the input signal and the output signal; and a processing circuit responsive to the output signal and

configured to detect resonant frequency changes of the sensor due to mass changes to measure mass loading. Applicants have also amended independent claims 17, 18, 20, 31 and 32 to recite a similar feature.

Duncan shows a method and apparatus for measuring the natural resonant frequency of an element, and in particular a cantilevered body. Duncan does not disclose or suggest, however, a sensor readout circuit that includes a phase detector circuit responsive to an output signal from a flexure plate wave sensor and an input signal to the flexure plate wave sensor, as claimed by Applicants. The Examiner states on page 3 of the Office Action dated May 25, 2004 that "Duncan discloses cantilever deflection broadly interpreted as flexure plate wave device." However, one skilled in the art would clearly understand that a flexure plate wave sensor, as claimed by Applicants, is markedly different from and does not encompass a cantilever deflection system, such as that disclosed in Duncan. For example, whereas cantilevered spring element 10 of Duncan is supported at one end by fulcrum 16, a flexure plate wave sensor may include a membrane layer disposed over a silicon substrate which defines a cavity, as shown in U.S. Patent No. 6,688,158. A result of this difference is that a flexure plate wave sensor has a wider range of applications than a sensor using a cantilevered body. Some of the applications for a flexure plate wave sensor include a sensor for a gas analyzer device capable of detecting the presence and concentration of hundreds of molecular components with less than one part per billion minimum detectable concentration sensitivity; a sensor for a liquid analyzing device capable of analyzing samples for several hundred possible contaminants or components simultaneously; or a sensor for a DNA sequencing device, as a virus/antibody detection device and for biological weapon detection. Since Duncan does not disclose or suggest a phase detector circuit responsive to both an output signal from and an input signal to a flexure plate wave

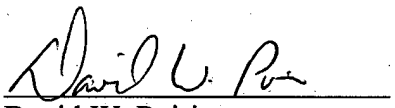
sensor, but rather relates to sensing the natural frequency of a cantilevered spring element, Duncan does not anticipate nor make obvious the subject invention as claimed.

Also, it would not have been obvious to one skilled in the art to combine a flexure plate wave sensor with the device of Duncan because frequency locking electronics are not typically or readily configurable to flexure plate wave sensors.

Therefore, Applicants' independent claims are clearly novel and non-obvious in light of Duncan and Sauerland. Accordingly, the Applicants respectfully request allowance of these amended claims and their respective dependent claims.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts at (781) 890-5678.

Respectfully submitted,



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